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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/603,689	06/26/2003	Hidetoshi Ohnuma	SON-2769	2872

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WASHINGTON, DC 20036

EXAMINER

CHACKO DAVIS, DABORAH

ART UNIT	PAPER NUMBER
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1756

MAIL DATE	DELIVERY MODE
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07/11/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/603,689

Applicant(s)

OHNUMA, HIDETOSHI

Examiner

Daborah Chacko-Davis

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 April 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 25,26 and 31-42 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 25-26, 31-42 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. The amendment to the claims filed on April 3, 2007, does not comply with the requirements of 37 CFR 1.121(c) because the amended claim 25 has an improper status identifier viz., "(Previously presented)". This status identifier should be replaced with "(Currently amended)".

Claim 25, filed December 27, 2006, does not have the added subject matter "forming an absorption film on said V-line reflective mask, said absorption film being adapted to absorb said light". Claim 26, filed December 27, 2006, does not have the added subject matter, "forming an absorption film on said H-line reflective mask, said absorption film being adapted to absorb said light". The text of any added subject matter must be shown by underlining the added text.

Also, claim 25, filed December 27, 2006, recites "The mask fabrication method as cited in Claim 21, wherein said mask pattern for said H-line reflective mask consists only of said H-line pattern forming elements." This text is present in the claim 25 (filed April 3, 2007) as partly stricken-through and partly underlined. However, this limitation should not be underlined in the presently filed claim 25 (filed April 3, 2007).

Similarly, claim 26, filed December 27, 2006, recites "The exposure method as cited in Claim 21, wherein a projection of said of V-line pattern forming elements is adapted to extend onto said wafer in a first direction." This text is not present in the claim 26 (currently amended) (filed April 3, 2007). The text of any deleted matter must

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be shown by strike-through. Amendments to the claims filed on or after July 30, 2003 must comply with 37 CFR 1.121(c), which states:

(c) *Claims.* Amendments to a claim must be made by rewriting the entire claim with all changes (e.g., additions and deletions) as indicated in this subsection, except when the claim is being canceled. Each amendment document that includes a change to an existing claim, cancellation of an existing claim or addition of a new claim, must include a complete listing of all claims ever presented, including the text of all pending and withdrawn claims, in the application. The claim listing, including the text of the claims, in the amendment document will serve to replace all prior versions of the claims, in the application. In the claim listing, the status of every claim must be indicated after its claim number by using one of the following identifiers in a parenthetical expression: (Original), (Currently amended), (Canceled), (Withdrawn), (Previously presented), (New), and (Not entered).

(1) *Claim listing.* All of the claims presented in a claim listing shall be presented in ascending numerical order. Consecutive claims having the same status of "canceled" or "not entered" may be aggregated into one statement (e.g., Claims 1–5 (canceled)). The claim listing shall commence on a separate sheet of the amendment document and the sheet(s) that contain the text of any part of the claims shall not contain any other part of the amendment.

(2) *When claim text with markings is required.* All claims being currently amended in an amendment paper shall be presented in the claim listing, indicate a status of "currently amended," and be submitted with markings to indicate the changes that have been made relative to the immediate prior version of the claims. The text of any added subject matter must be shown by underlining the added text. The text of any deleted matter must be shown by strike-through except that double brackets placed before and after the deleted characters may be used to show deletion of five or fewer consecutive characters. The text of any deleted subject matter must be shown by being placed within double brackets if strike-through cannot be easily perceived. Only claims having the status of "currently amended," or "withdrawn" if also being amended, shall include markings. If a withdrawn claim is currently amended, its status in the claim listing may be identified as "withdrawn—currently amended."

(3) *When claim text in clean version is required.* The text of all pending claims not being currently amended shall be presented in the claim listing in clean version, i.e., without any markings in the presentation of text. The presentation of a clean version of any claim having the status of "original," "withdrawn" or "previously presented" will constitute an assertion that it has not been changed relative to the immediate prior version, except to omit markings that may have been present in the immediate prior version of the claims of the status of "withdrawn" or "previously presented." Any claim added by amendment must be indicated with the status of "new" and presented in clean version, i.e., without any underlining.

(4) *When claim text shall not be presented; canceling a claim.*

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(i) No claim text shall be presented for any claim in the claim listing with the status of "canceled" or "not entered."

(ii) Cancellation of a claim shall be effected by an instruction to cancel a particular claim number. Identifying the status of a claim in the claim listing as "canceled" will constitute an instruction to cancel the claim.

(5) *Reinstatement of previously canceled claim.* A claim which was previously canceled may be reinstated only by adding the claim as a "new" claim with a new claim number.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

3. Claims 31-38, 41-42, are rejected under 35 U.S.C. 102(a) as being anticipated by U. S. Patent Application Publication No. 2001/0055733 (Irie et al., hereinafter referred to as Irie).

Irie, in [0002], [0092], [0111], [0112], [0113], [0114], [0115], discloses a pattern to be projected onto the wafer during exposure via the reticles (R1 to RN) are provided from the storage device via the main control system, and that the data corresponding to the X-direction elements (H-line mask data, δx) and the data corresponding to the Y-direction elements (V-line mask data, δy) are prepared by the image data of the computer, and are partitioned longitudinally and laterally (H-line mask and V-line mask). Irie, in the abstract, in [0013], [0015], [0022], [0048], [0060], [0086], [0088], [0089], [0090], [0091], [0099], [0100], [0116], [0117], [0129], [0155], [0156], [0157], [0158], and in figures 2B, 4, and 6, discloses a method of projecting a desired pattern

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(photolithography) on a device substrate (wafer) to form a photomask using a reflective mask (reticle for use in the EUV exposure region, therefore are reflective) comprising providing reticles (master reticles R1....RN) each having pattern elements (mark elements) with mark elements aligned in the X-direction (125X, reticle with mark elements horizontal to the projection vector is same as the H-line reflective mask), and mark elements aligned in the Y-direction perpendicular to the projection vector (reticle with 125Y mark elements is same as the V-line mask), wherein the reticle is rotated by rotational means (main control system) so as to align the corresponding mark elements (either mark element in the X-direction or mark element in the Y-direction) in the Z-direction (such that the reflected light is projected along the projection vector in the projection direction and extended on to the wafer (substrate, reference 4), best focus position), and perform sequential exposures; X-direction elements i.e., H-line mask rotated about 90 degree to align (said direction alignable in the projection direction) in the projection beam, and then irradiated, followed by the Y-direction elements i.e., Y-line mask rotated about 90 degree (first direction alignable in the projection direction) to align with the projection beam, performing plural exposures, through the respective reticles; and forming the desired pattern on the substrate (reference 4) (claims 31, 32, 35-36). Irie, in [0084], [0085], [0101], [0107], and in figures 12A, and 13A, illustrates that the light incident on the reticle (R_i) is skewed from the normal of the reflective plane (claims 33-34). Irie, in [0022], [0062], [0072], and [0088], and in figures 2B, 4, and 6, discloses that the reticle pattern that includes the mark elements formed in the Y-direction (125Y, the V-line mask) has a projection relative to the projection vector (best

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focus position) corresponds to the scanning direction (first direction) of the optical system (exposure system), and that the reticle that has mark elements in the X-direction i.e., the H-line mask projects light to the wafer in a direction horizontal to the projection vector (a direction other than the first direction) (claims 37-38). Irie, in [0154], [0155], discloses that the exposure light is either a EUV ray or an X-ray (claim 41). Irie, in [0087], discloses that the patterns can be formed on the substrate using an electron beam system (electron beam exposure performed, i.e., the charged particle beam is an electron beam) (claim 42).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 25-26, are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent Application Publication No. 2001/0055733 (Irie et al., hereinafter referred to as Irie) in view of U. S. Patent No. 6,593,037 (Gabriel et al., hereinafter referred to as Gabriel).

Irie, in [0002], [0092], [0111], [0112], [0113], [0114], [0115], discloses a pattern to be projected onto the wafer during exposure via the reticles (R1 to RN) are provided from the storage device via the main control system, and that the data corresponding to the X-direction elements (H-line mask data, δx) and the data corresponding to the Y-

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direction elements (V-line mask data, δy) are prepared by the image data of the computer, and are partitioned longitudinally and laterally (H-line mask and V-line mask). Irie, in the abstract, in [0013], [0015], [0022], [0048], [0060], [0086], [0088], [0089], [0090], [0091], [0099], [0100], [0116], [0117], [0129], [0155], [0156], [0157], [0158], and in figures 2B, 4, and 6, discloses a method of projecting a desired pattern (photolithography) on a device substrate (wafer) to form a photomask using a reflective mask (reticle for use in the EUV exposure region, the exposure mask used in EUV is inherently reflective) comprising providing reticles (master reticles R1....RN) each having pattern elements (mark elements) with mark elements aligned in the X-direction (125X, reticle with mark elements horizontal to the projection vector is same as the H-line reflective mask), and mark elements aligned in the Y-direction perpendicular to the projection vector (reticle with 125Y mark elements is same as the V-line mask), wherein the reticle is rotated by rotational means (main control system) so as to align the corresponding mark elements (either mark element in the X-direction or mark element in the Y-direction) in the Z-direction (such that the reflected light is projected along the projection vector in the projection direction and extended on to the wafer (substrate, reference 4), best focus position), and perform sequential exposures; X-direction elements i.e., H-line mask rotated about 90 degree to align (said direction alignable in the projection direction) in the projection beam, and then irradiated, followed by the Y-direction elements i.e., Y-line mask rotated about 90 degree (first direction alignable in the projection direction) to align with the projection beam, performing plural exposures,

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through the respective reticles; and forming the desired pattern on the substrate (reference 4) (claims 25, and 26).

The difference between the claims and Irie is that Irie does not disclose that the reticle (either the V-line mask or the H-line mask) has an absorption film.

Gabriel, in col 3, lines 53-56, and in col 4, lines 43-51, discloses that the EUV mask has an absorptive layer that absorbs radiation in the EUV wavelength.

Therefore, it would be obvious to a skilled artisan to modify Irie by employing the absorptive film layer on the corresponding mask as suggested by Gabriel because Irie discloses that the exposure is performed in the EUV exposure wavelengths i.e., the mask has to be reflective, and Gabriel, in col 2, lines 33-37, in col 4, lines 66-67, in col 5, lines 1-3, and lines 35-42, discloses that the mask or reticle that includes an absorptive layer is configured to reduce a reflection of a lithographic radiation having a wavelength shorter than in a DUV region (EUV wavelengths) and that the absorptive layer on the mask or reticle is optimized to cancel undesirable reflections via destructive interference so as to preserve the image contrast of the mask or the reticle.

6. Claims 39-40, are rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Patent Application Publication No. 2001/0055733 (Irie et al., hereinafter referred to as Irie) in view of U. S. Patent No. 6,593,037 (Gabriel et al., hereinafter referred to as Gabriel).

Irie is discussed in paragraph no. 3.

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The difference between the claims and Irie is that Irie does not disclose that the reticle (either the V-line mask or the H-line mask) has an absorption film adapted to absorb light (claims 38-39).

Gabriel, in col 3, lines 53-56, and in col 4, lines 43-51, discloses that the EUV mask has an absorptive layer that absorbs radiation in the EUV wavelength.

Therefore, it would be obvious to a skilled artisan to modify Irie by employing the absorptive film layer on the corresponding mask as suggested by Gabriel because Irie discloses that the exposure is performed in the EUV exposure wavelengths i.e., the mask has to be reflective, and Gabriel, in col 2, lines 33-37, in col 4, lines 66-67, in col 5, lines 1-3, and lines 35-42, discloses that the mask or reticle that includes an absorptive layer is configured to reduce a reflection of a lithographic radiation having a wavelength shorter than in a DUV region (EUV wavelengths) and that the absorptive layer on the mask or reticle is optimized to cancel undesirable reflections via destructive interference so as to preserve the image contrast of the mask or the reticle.

Response to Arguments

7. Applicant's arguments filed April 3, 2007, with respect to claims 31-38, and 41-42, have been fully considered but they are not persuasive. Applicant's arguments, see Amendment, filed April 3, 2007, with respect to claim(s) 25-26, and 39-40, have been fully considered and are persuasive. Therefore, the rejection (s) of claims 25-26, under 35 U.S.C. 102 (a), has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of U. S. Patent No. 6,593,037 (Gabriel et al., hereinafter referred to as Gabriel).

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A) Applicants argue that Irie fails to disclose, teach or suggest the reflection type mask as having an absorption film formed thereon.

Irie teaches the use of a mask in a EUV exposure system i.e., using an EUV reflective mask. However, Gabriel is depended upon to disclose the use of a reflective mask that has an absorptive layer.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP.

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daborah Chacko-Davis whose telephone number is (571) 272-1380. The examiner can normally be reached on M-F 9:30 - 6:00. If attempts to reach the examiner by telephone are unsuccessful, the examiner's

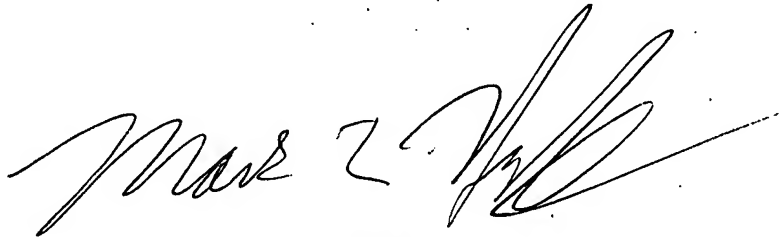
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supervisor, Mark F Huff can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

dcd

July 3, 2007.

A handwritten signature in black ink, appearing to read "Mark F. Huff", with a stylized flourish extending to the right.

MARK F. HUFF
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700